

K. Smith (R). Dr. 7 R.S. &c.

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POSTSCRIPT

TO

DR. SMITH'S HARMONICS,

K.



The changeable harpsichord:

Which being supplied with all the useful flat and sharp sounds and tuned in the best manner, is made as harmonious as possible: and yet the execution of music upon this perfect instrument is the same as upon the common harpsichord.



LONDON:

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TO the RIGHT HONOURABLE
Sir EDWARD WALPOLE,
KNIGHT of the BATH, and one of HIS
MAJESTY'S most Honourable Privy-
Council for the Kingdom of IRE-
LAND,

S I R,

AS one of the fine arts in which
you are extremely well versed is
music, the perusing this account of the
changeable harpsichord, if it should
not amuse you, can cost you no more
than the reading a news paper; but if
it should entertain you, That would
be a pleasure to,

S I R,

Your most affectionate friend
and obliged humble servant,

Trinity College,
Cambridge,
June 11, 1762.

ROBERT SMITH,

To the Right Honourable

SIR EDWARD WALPOLE

Knight of the Bath, and one of His
Majesty's most Honourable Privy-
Council for the Kingdom of Eng-

land.

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SIR,

Your most affectionate friend

and obliged humble servant

ROBERT SMITH

Trinity College
Cambridge
June 11, 1702

POSTSCRIPT.

I. *The nature and design of the changeable harpsichord.*

PLATE xxix. Fig. 1. The seven primary or natural notes placed in this order *FCGDAEB* in the middle of the progression and repeated on the right hand with sharps and on the left with flats, represent an indefinite scale of sounds continually ascending or descending by *vth*; in which it is observable, that the 12 notes within the two bars denote all the sounds in each octave of the Common Scale in organs and harpsichords; and that the notes without the bars are not improperly called Extreme Notes and distinguished sometimes from the common notes by circles round them.

The common harpsichord then has no sounds for the extreme notes; and yet they are so often wanted that far the greater part of the best compositions cannot be performed without them; except by substituting, as usual, the common sounds *E^b B^b, F C*, &c for the extreme sharp

sounds $D^* A^*$, $E^* B^*$, &c respectively, and the common sounds $G^* C^*$, $F^* B$, &c for the extreme flat ones $A^b D^b$, $G^b C^b$, &c, which Substitutes differing from the respective extreme sounds by about one fifth of the tone, make very bad harmony.

Fig. 2 or 3 or both. To prevent this dissonance, the changeable harpsichord has strings ready tuned to the extreme notes, which are written on the Foreboard in couples on one side of each stop, and their respective substitutes in opposite couples on the other side; and when any stop is pushed toward an extreme note or notes as D^* and A^* , the keys of their opposite substitutes E^b and B^b will strike D^* and A^* respectively, while the substitutes themselves are silent till that stop be pushed back to them. The same is to be understood of every stop.

H. *To adapt this changeable scale to any proposed piece of music.*

Fig. 2 or 3 or both. First push all the stops towards the notes of the common scale above-mentioned, and the keys will strike it.

Then look for the key of the proposed piece of music in the first column of this Table, and opposite to it you will see whether any, or which of the extreme sounds must be added to the common scale, in order to adapt it to the piece proposed.

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The Keys.

Add at first

C, F, B ^b with a major III ^d	} no extreme sounds.
A, D, G with a minor 3 ^d	
E ^b , A ^b III ^d	} A ^b D ^b
G, E..... 3 ^d	
G, D..... III ^d	} D* A*
E, B..... 3 ^d	
A, E..... III ^d	} D* A*, E* B*
F*, C*..... 3 ^d	

The rest of the extreme flats and sharps have not yet been used enough to be reducible to any general rule.

The rules in the table are founded in practice and were given me by an ingenious Friend: As they are only general, they are sometimes liable to exceptions; but these may be guarded against either by looking over the piece beforehand, or else occasionally, in the course of playing it. For the stops of this harpsichord answer so readily to the touch of the hand, that when a performer has fixed in his mind the order and position of the notes on the foreboard, it is matter of fact that he soon gets a knack of changing, without loss of time, any sound for another which he foresees is coming into play. To help his memory let him observe, that all the extreme sharp notes are on the right hand side of the three higher stops, and the extreme flat ones

on the left side of the lower : all on the same side ascending or descending by *vth*.

R E M A R K S.

About five years ago Mr. Kirkman made me a changeable harpsichord, which is much admired by the best judges for the delicacy and distinctness of the harmony ; owing not only to a more copious scale and a better tuning than usual, but also to single strings ; which when the pens are as strong as they ought to be, throw out clearer and distincter sounds than unisons, and loud enough for very large rooms, especially in playing *Softenuato*, as on the organ. This unexpected degree of loudness I attribute not only to the stronger pens, but partly to the weaker pressure of fewer strings upon the belly of the instrument, by about one fifth of the whole ; and partly to a third cause which is explained in the *Harmonics* (*a*). And besides ; as the strings are single, constant care is taken as often as they are tuned to change any string that is become false.

The seven extreme sounds noted on the foreboard in Fig. 2. are generally sufficient for executing the best compositions ; any remoter sound from the common scale, as *G^b* or *C^b* &c, in Fig. 1, being very seldom used ; perhaps not once in 50 or 100 pieces of music. But if any more be desired, Fig. 3 represents a foreboard with three stops at each end, by which all the 12 sounds in the

(*a*) Pag. 171, &c. 2d Edit,

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the common scale, or any part of them, might be changed into as many extreme sounds.

For supposing the strings of a common harpsichord to be tuned to the notes written by the sides of the tuning pins, represented in Fig. 4, and a proper slider to be made for every stop according to the General Pattern in this figure and the directions in the Harmonics (*b*), it is easy to conceive how this complete harpsichord might be made: Where, if any part of the sounds at the extremities of this extensive scale be deemed useless, by leaving out their strings and whatever belongs to them, the complete design will become simpler, as in Fig. 2. or any other case.

I take this opportunity to inform the reader that this notation of the strings and jack-holes in Fig. 4, is preferable to that in Fig. 67, Plate xxvi of the Harmonics, which figure was designed only for a particular foreboard.

III. *To tune the changeable scale.*

Fig. 5. The sounds in the octave below the middlemost *c* are hereafter denoted by great letters *CDEFGABc*, and those above it, by small letters, *cdefgabbc'd'e' &c.*

Having pushed the stops from all the extreme notes, that the keys may strike the common scale; near the middle of it make any *vth* as *G d* a little flatter than perfect, and the next *vth* *d a*

a

a little flatter too, and just as good as Gd in the judgment of the ear. Then tune downward the VIIIth aA and upward the perfect xth Gb , and by altering the sound e between A and b , make the vth Ae, eb equally good; and if they be just as good as Gd, da , those four vth are rightly tuned; if not, they must be corrected as follows.

Case 1. If the vth Gd, da happen to be better than Ae, eb , flatten d till Gd be a little worse than it was, but not so bad as Ae ; and by flattening a make da just as good as Gd :

Case 2. On the contrary, if the vth Gd, da happen to be worse than Ae, eb , sharpen d till Gd be a little better than it was, but not so good as Ae ; and by sharpening a make da just as good as Gd :

In either case tune down the VIIIth aA as before, and alter e , till the vth Ae, eb are equally good; and if they be just as good as Gd, da , those four vth are rightly tuned; if not, which seldom happens, they must be corrected again as before.

It remains to make all the other vth equal to those four, Gd, da, Ae, eb .

The first method.

Having tuned down the next VIIIth bB , tune up the perfect xth Ac^* , and alter f^* till the vth Bf^*, f^*c^* are equally good; then they are equal to Ae, eb , as they ought to be.

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By repeating this operation upon the successive higher notes, and remembering at g^* to put in all the extreme sharp sounds, the upper half of the scale will be rightly tuned.

Then for the lower half, tune upward the $viii^{th}$ Gg and downward the perfect x^{th} aF , and by altering c till the v^{th} Fc , $c g$ are equally good, they will be equal to Gd, da .

By repeating this last operation on the successive lower notes and remembering at E^b to put in all the extreme flat sounds, the lower half of the scale will be rightly tuned. Lastly, tune $viii^{th}$ to every one of those notes.

The second method.

After the four v^{th} Gd, da, Ae, eb are made equal as above, tune down the $viii^{th}$ bB ; and the iii^{d} GB being perfect, tune up the iii^{d} df^* perfect, then the v^{th} Bf^* is equal to Gd , as it ought to be.

Likewise having put in all the extreme sharp sounds, tune up perfect iii^{d} from A to c^* , and from e to g^* , then the v^{th} $c^* g^*$ is equal to Ae . Proceed in the same manner through the upper half of the scale.

Then for the lower half, tune up the $viii^{th}$ Gg , and the iii^{d} bg being perfect, tune down the iii^{d} ec perfect, then is the v^{th} cg equal to eb .

Likewise having put in all the extreme flat sounds, tune down perfect iii^{d} from d to B^b , and from a to f , then the v^{th} $B^b f$ is equal to da .

Pro-

Proceed in the same manner to the lower end of the scale.

In this method the highest and lowest sounds c^{**} , d^{**} , e^{**} , f^{**} , and F , E^b , D^b , &c, are not used; therefore tune VIIIth to all the rest.

REMARKS.

The harmony of the changeable scale tuned as above, by perfect x^{th} or III^{th} , is much smoother and finer than that of the common scale, tuned as usual by very sharp III^{th} . And if the x^{th} and III^{th} of the changeable scale be all made a little flatter than perfect, the harmony of it will be a little farther improved, and indeed as far as possible.

For which reason and because the strings are single, this scale will continue longer in tune than that of unisons in the common harpsichord; and yet it deserves to be often tuned, because the beauty and excellence of it depends greatly on the accuracy of the tuning and strength of the penning.

Many other properties and advantages of the changeable scale are explained in the Harmonics, Sect. VIII.